^{173}Er β^- decay 1972Pu02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	V. S. Shirley	NDS 75,377 (1995)	1-Oct-1993

Parent: ^{173}Er: E=0.0; J^π=(7/2$^-$); $T_{1/2}$=1.4 min *1*; Q(β^-)=2600 *SY*; %β^- decay=100.0

Sources from ^{176}Yb(n,α) (E(n)=14-15 MeV, natural and enriched (96.43%) Yb oxide targets); measured Eγ, Iγ (Ge(Li), FWHM=650 eV at 60 keV and 3.5 keV at 1333 keV), prompt and delayed $\gamma\gamma$ and $\gamma\beta$ coin (combinations of Ge(Li), NaI and plastic detectors).

Some sequences of transitions in cascades are undetermined; decay scheme shows choices dictated by structure considerations.

^{173}Tm Levels

Band structure: see Adopted Levels.

E(level)	J^π	$T_{1/2}$	Comments
0.0	(1/2$^+$)	8.24 h *8*	
2.46 *14*	(3/2$^+$)		
118.60 *14*	(5/2$^+$)		
124.86 *15*	(7/2$^+$)		
317.73 *20*	(7/2$^-$)	10 μs *3*	$T_{1/2}$: from $\gamma\beta$(t).
411.9 *3*	(9/2$^-$)		
1212.9 *4*	(9/2$^-$)		

β^- radiations

β^- feedings are from intensity imbalance at each level and absence of feeding to g.s. band.

E(decay)	E(level)	Iβ^-[†]	Log *ft*	Comments
(1387 *SY*)	1212.9	63 *5*	4.5	av Eβ= 490
(2188 *SY*)	411.9	13 *6*	5.9	av Eβ= 800
(2282 *SY*)	317.73	23 *8*	5.7	av Eβ= 900

[†] Absolute intensity per 100 decays.

$\gamma(^{173}Tm)$

Iγ normalization: from total I(γ+ce) from 317.7 level=100% (γβ coincidence data show absence of direct feeding to g.s. band, consistent with ΔK=3). With this normalization, however, the total transitions to the ^{173}Tm g.s. is 114% 11; the 1/2[411] rotational structure is of course not uniquely determined by the coincidence results. Band parameters support the proposed level sequence.
Iγ(Tm K x ray)=140 *30* (exp) and 134.6 (from decay scheme), relative to Iγ=100 for 199.2γ.

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ	α[#]	$I_{(\gamma+ce)}$[‡]	Comments
(2.46 *20*)	0.24 *3*	2.46	(3/2$^+$)	0.0	(1/2$^+$)	[M1]		933	223 *22*	α(M)= 702 E_γ: deduced from energy difference between 116.14γ and 118.6γ. $I_{(\gamma+ce)}$: deduced from intensity balance at 2.5 level (no direct β^- feeding for decay to g.s. band (ΔK=3)). I_γ: deduced from I(γ+ce) and α.
94.2 *2*	10 *2*	411.9	(9/2$^-$)	317.73	(7/2$^-$)	(M1)		3.78		α(K)= 3.16; α(L)= 0.479; α(M)= 0.106; α(N+..)= 0.0310 α(K)exp=3.8 *7*.
[x]96.1										
[x]101.2										
[x]111.5										
116.14 *4*	39 *6*	118.60	(5/2$^+$)	2.46	(3/2$^+$)	(M1+E2)	0.5 *+11−5*	2.01 *15*		α(K)= 1.5 *5*; α(L)= 0.4 *3*; α(M)= 0.08 *7*; α(N+..)= 0.024 *19* α(K)exp=1.5 *5*.
118.6 *2*	5.3 *13*	118.60	(5/2$^+$)	0.0	(1/2$^+$)	[E2]		1.64		α(K)= 0.702; α(L)= 0.717; α(M)= 0.174; α(N+..)= 0.0485
122.40 *4*	43 *5*	124.86	(7/2$^+$)	2.46	(3/2$^+$)	(E2)		1.46		α(K)= 0.647; α(L)= 0.622; α(M)= 0.151; α(N+..)= 0.0420 α(K)exp=1.1 *9*.
192.8 *2*	97 *10*	317.73	(7/2$^-$)	124.86	(7/2$^+$)	(E1)		0.0594		α(K)= 0.0498; α(L)= 0.00748; α(M)= 0.00166; α(N+..)= 0.000463 %Iγ=46.6 *24*. Mult.: deduced from α(total)=0.09 *17*, required by decay-scheme intensity balance; α(K)exp<0.9 is consistent with E1, but does not rule out M1 and/or E2.
199.2 *2*	100	317.73	(7/2$^-$)	118.60	(5/2$^+$)	(E1)		0.0545		α(K)= 0.0457; α(L)= 0.00685; α(M)= 0.00152; α(N+..)= 0.000424 Mult.: E1, M1, or E2 from α(total)=0.31 *20*. Decay scheme requires E1. Intensity balance; α(K)exp<0.9 is consistent with E1, but does not rule out M1 and/or E2.
315.2		317.73	(7/2$^-$)	2.46	(3/2$^+$)					Observed by 1973DrZK; no ΔE or Iγ reported.

^{173}Er β^- decay 1972Pu02 (continued)

$\gamma(^{173}Tm)$ (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π
800.8 *6*	20 *7*	1212.9	(9/2$^-$)	411.9	(9/2$^-$)
895.2 *4*	112 *8*	1212.9	(9/2$^-$)	317.73	(7/2$^-$)

[†] From α(K)exp, as deduced from I(Tm K x ray)/Iγ in coincidence spectra, except where noted.
[‡] For absolute intensity per 100 decays, multiply by 0.480 *24*.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[x] γ ray not placed in level scheme.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays